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A STUDENT OF NATURE..

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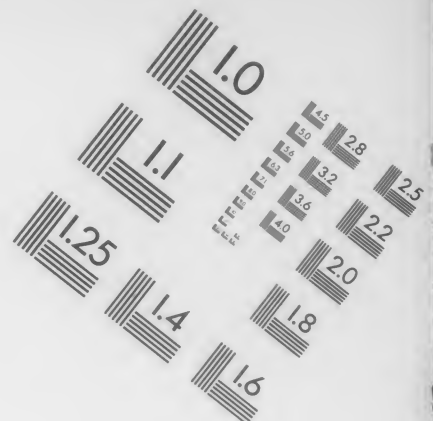
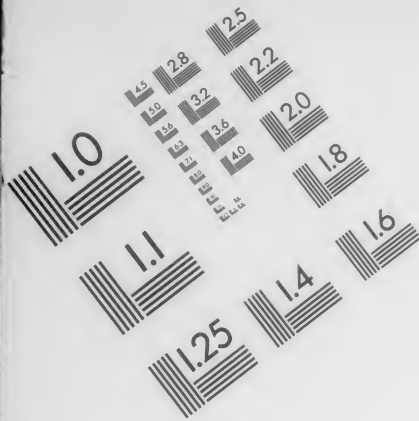


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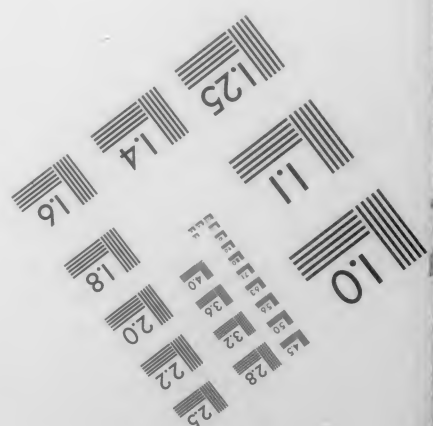
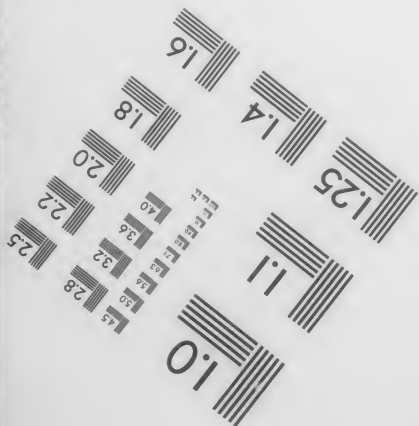
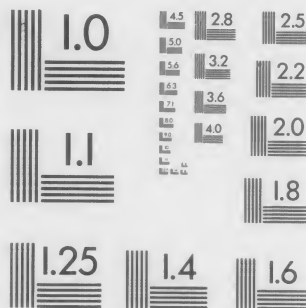
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SOME CONCLUSIONS

BY A STUDENT OF NATURE,

ON SOME OF

NATURE'S PROBLEMS

*That are at variance with some of the
accepted Theories of Scientists.*

By JOHN McDONALD, Hardin, Ill.

NEW YORK:
B. BROWN, Printer and Binder,
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ATTRACTIVE OR ELECTRICAL AGENTS.

I believe there exists upon the surface of the earth in addition to what is recognized as ponderable matter a great many attractive or electrical agents or classes of attractive or electrical agents. Those agents I believe possess certain properties in common with ponderable matter, notably the susceptibility of existing in great tenuity in certain conditions and great degrees of condensation in other conditions. I believe that those agents possess a varied attraction or affinity for each other and for the varied types of ponderable matter. I believe that those agents exist in more or less condensed conditions as component parts of all or nearly all the varied types of matter existing on the surface of the earth. The action of the sun and other causes operate to cause more or less of those agents to become separated from other agents or matter for which they have attracted or affinity and there recombination with such agents or matter is some times recognized as chemical action, and some times as electrical action.

LIGHT.

I believe light results from an unsatisfied condition of attractive agents corresponding to the colors of the spectrum. I believe that more or less of those agents exist as component parts of all light giving substances. When those substances are transformed

by chemical action, those agents are set free and radiate in tenuous conditions, as light until they are absorbed or combined with matter or other agents for which they have an attraction or affinity. Hence I believe that light results from changing conditions of agents and matter existing on the surface of the earth. I believe that while the sun may be a luminous body radiating more or less light that the greater part of sun or day light existing on the surface of the earth results from chemical action, or changes of agents and matter on the earth surface caused by the rays or attraction of the sun. I believe that agents that play a part in the production of light exist in a condensed form as component parts of an organ of the brain, and the nerve of the eye is the electrical channel by which that portion of the brain is affected, by a disturbed condition of those agents in surrounding objects. I believe that observations noted by the mind are absorbed by the eye, conveyed by its nerve to the brain and become in a condensed form a component part of the same, enabling memory to recur to it at will.

HEAT.

Heat I believe to be an unsatisfied condition of a class of attractive agents that like light, are susceptible of existing in condensed or tenuous conditions when those agents exist in a satisfied condition with matter and other agents heat is not apparent. When they exist in an unsatisfied condition as a component part of matter the substance is hot when such sub-

stance is chemically transformed. Those agents having existed therein in condensed forms radiate as heat until they combine or are absorbed by matter or other agents for which they have attraction or affinity. If the substance is not chemically transformed it remains hot until other agents or matter is combined or absorbed in sufficient quantities to cause them to exist in the substance in a satisfied condition.

COLD.

Cold like light and heat I believe to be an unsatisfied condition of a class of attractive agents. Those agents are susceptible of existing in condensed or tenuous conditions when they exist in condensed forms as component parts of matter and in unsatisfied conditions the substance is cold. When the air is saturated with those agents while they are in an unsatisfied condition it is sensibly cold. Hence I believe that whether a substance is hot or cold depends upon the quality and combination of the agents that are component parts of it. A substance may be warmed by the infusion of agents that represent heat to neutralize the agents that represent cold that exist therein or it may be warmed by the withdrawal of agents representing cold to neutralize agents representing heat in contiguous bodies. I believe that water in its various forms is Nature's greatest reservoir of condensed cold. I claim that an ice house filled with ice is a representative store house of cold. The continued exposure

to cold necessary to freeze water after it becomes ice cold is due to the amount of condensed cold necessary to harden the same, and the continued application of heat after ice is reduced to the melting point, is due to the amount of heat necessary to neutralize the condensed cold that exists in the ice. Water under certain conditions remains liquid when reduced several degrees below the freezing point when in that condition a slight agitation causes a small portion of the water to form into ice, and the remainder of the water rises in temperature to the freezing point. I believe that in such cases the excess of cold is consumed by its being condensed in the formation of the ice. I do not believe that any heat is given out when water is frozen, in such cases heat cannot be produced above the freezing point and the temperature is only raised to the freezing point by the consumption of cold in the act of forming ice.

A pound of ice at 32 F. mixed with a pound of water at 142 F. the whole becomes ice cold water. The 110 degrees of heat has disappeared. We are told that it has become latent or has done work and will reappear when the work is undone or the pound of water is again frozen, a statement I do not believe, but, believe that there was condensed cold enough in the pound of ice to neutralize the 110 degrees of heat in the pound of water. Water vaporizes when the condensing agents representing cold that it contains is neutralized by heat. When air and vapor are withdrawn from the surface of

water the condensed cold existing as a component of water and having no existence as a component of vapor remains and soon transforms the remainder of the water into ice. Ice and salt as solids contain more condensed cold than they do when they are combined to form a liquid. When they unite and form a liquid that condensed cold is set free and appears as sensible cold. Condensed cold becomes sensible cold when water is evaporated. When our clothing becomes wet a sensation of cold accompanies the evaporation that follows. Moisture evinces an affinity for condensed cold by forming on cold substances.

The sun, I believe, attracts cold and moisture, or the agents that produce them, from substances on the surface of the earth, holding them suspended in the upper regions of the atmosphere; when the sun's action ceases as night approaches the cold and moisture returns to the surface of the earth and tries to unite with agents and matter from which they have been separated, and to this cause, I believe, is due the degree of moisture on and the degree of cold existing in vicinity of vegetation at dawn of day in summer time, the sun's action having effected more chemical change in vegetation than in other substances on the surface of the earth. A line of reasoning led me to believe that the rays of the sun did not produce heat in substances wherein they did not effect chemical action. As a test, I let the concentrated rays of the sun impinge in an indenture made in pulverized salt. They could not pass through,

neither could they be reflected or refracted to any material extent, yet they did not heat the salt more than might be accounted for by impurities therein. This theory is sustained by the fact that the sun's rays does not heat dried air or the elementary gasses, as no chemical action is effected in such cases. I have seen the sun shine on snow-covered fields for days without softening the frosty crust thereon, except where vegetation stubs protruded through the snow. Around each stub the snow was melted to the ground. I have seen the same thing where fields were covered with ice. If the snow-capped peaks in Equatorial regions had a proper admixture of carbonous compounds permeating their snow it would soon all be melted; but, under existing conditions, the waves constituting the sun's efflux of heat that beat against those snow-capped peaks fail to perform the duty that men of science have assigned to them.

SOUND.

Sound, I believe, is a disturbed condition of a class of attractive agents. Those agents, I believe, exist in tenuous conditions as component parts of air. I believe also that they are susceptible of existing in condensed conditions and do so exist in all explosives or sound-producing substances. Whether sound is the concussion caused by a disturbed conditions of those agents, or is due to an interchange of attraction between them and matter, I have not formed a definite opinion, but believing those agents do exist

in condensed conditions, and that the organ of the brain that enables us to distinguish sound has condensed in it agents that electrically or attractively enable it to receive and note sounds. I am inclined to believe that attraction or affinity between certain classes of agents have to do with the production, transmission and reception of sounds. The air and other matter being component parts of those agents that play a part in the production of sounds are so affected by the interchange of those agents in the production of sounds that sensible vibrations may occur therein.

ELECTRICITY.

I believe that the agents I have been describing and, perhaps, others, when they exist in more or less condensed conditions, and without being combined with matter, are recognized as electricity. I believe that the manifestations produced by electrical action are not all caused by one agent or one class of agents, but are due to changing conditions of different classes of attractive agents. Current electricity and frictional electricity are, I believe, produced by different classes of agents. Current electricity appears to be susceptible of passing through the substance of conductors, while frictional electricity only travels on the surface of conductors and only becomes component parts of matter by being chemically combined with same in processes resulting in the formation of different types of matter. When not combined with matter, whether dense or tenuous, it has an attraction or affinity for various

types of matter and it also has an attraction for current electricity. I believe that frictional electricity exists in tenuous conditions as component parts of air from whence it is principally derived either directly or indirectly.

Current electricity, I believe, is principally derived by its being liberated when chemical action transforms substances wherein it existed in condensed conditions. *I believe that attractive or electrical agents* have an affinity or attraction for various types of matter, which may be partly due to their affinity or attraction for various types of matter as such, but is likely in greater part due to their affinity or attraction for other attractive or electrical agents that are component parts of such matter. I believe that the behavior of magnets is partly due to a condensation of different agents, attractive or electrical, in the respective ends thereof, and partly due to other agents that condense on the surface of the respective ends of them, being attracted thereto partly by affinity for iron and partly by affinity for agents condensed therein. Electro-magnets wherein soft iron becomes by electrical action as hard as hardened steel, evinces that there is an addition therein of condensing agents. The behavior of platinum under certain conditions leads me to believe that it is capable of absorbing attractive or electrical agents.

FRICTIONAL ELECTRICITY,

I believe, is the only type of electricity that produces sparks. Frictional electricity having attrac-

tion for current electricity, likewise for conductors thereof in long galvanic circuits, sufficient frictional electricity condenses on the wire and accompanies the current to produce sparks when the circuit is broken. The frictional electricity condensed on the wire in seeking the coming galvanic current causes what is called self-inductive currents. Induced currents are due to the same cause, the length and small size of the wire in inductive coils admit of the wire and the air more intimately permeating each other, and consequently more electricity is condensed upon the wire. Induced electricity readily giving sparks evince its being of the frictional type. I believe that there are agents that play a part in the production of frictional electricity that likewise play a part in the production of sounds. Galvanic electricity I do not believe plays any part in the production of sounds but by attracting to and carrying with it frictional electricity. It serves an efficient purpose in transmitting for long distances without material loss that frictional electricity that does play a part in the production of sounds.

In using the telephone, I believe that the inspirations and expirations that produces articulate speech causes changing conditions in electrical agents that are stored or condensed in the transmitter, and the conducting wire causes similar changing conditions in similar condensed electrical agents that are component parts of the receiver, and the nerve of the ear acting as a conducting medium causes a similar changing condition of similar agents stored in the brain.

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When water is decomposed by electricity, a magnifying glass detects no agitation or transfer of matter between the poles from which is delivered the separated types of matter that water is composed of. This leads me to infer that it may be true that oxygen gas and hydrogen gas represent the same type of matter combined, with different types of attractive or electrical agents. When I consider the varied forms and appearances of substances, especially in organic chemistry, formed from a few elementary types of matter, I believe that there exists, as component parts of those substances, agents that like the scent and effluvia that emanate from many of them that have not been taken in account when chemists analyze them. Scents and effluvia, I believe, are considered as material matter, and I believe that material matter exists as component parts thereof, but that the ability to detect them and distinguish between them is due to attractive or electrical agents that are component parts of them. Air currents, winds and tornadoes, while in part are due to differences in density of the air, I believe in far greater part are due to agents that have been by chemical action separated from agents or matter for which they have attraction or affinity, and in seeking a readjustment, carrying with them the air that they have become component parts of. The energy with which the air moves in time of storms and tornadoes is caused by the intense chemical action occurring at the time the transformation of matter and agents that occur during storms often leave electrical agents uncombined with matter, when they condense and

seek a satisfactory combination—when doing so they are recognized as lightning.

CONSERVATION OF ENERGY.

The following extracts from Fergusons work on electricity page 82, defines the law of the conservation of energy as taught by scientists.

"The law of the *Conservation of Energy* asserts that the quantity of energy in the universe is a constant quantity. No energy can be created, no energy can be destroyed. Energy may be transformed from one form to another. Water or any raised mass may fall and so lose potential energy; but in falling it will either gain kinetic energy or do work by turning a wheel or in some other way. Gunpowder may explode and so lose its potential energy; but the bullet it has propelled and the gun which has recoiled have kinetic energy. Some of the energy of the powder has changed into energy of sound, and some into energy of heat and light. But if the energy of the bullet, and the gun, the energy of the sound, the heat, and the light be all measured, it will be found that their sum will equal the original energy of the powder. In other words, to do work of any kind, energy must be transformed from one form into another; and if any energy is seen to come into existence at one place, that must be due to an equivalent amount of energy having disappeared in another. No energy can disappear in one form without appearing in some other. Hence wherever we see energy of one form produced, we

should always be able to find that it is due to the transformation of energy of some other form."

I do not believe in the theory that energy never disappears under one form, without its equivalent appearing under some other form. I believe that stored energy is an unsatisfied condition of agents and matter wherein certain agents and matter remain in their present condition, until predisposing causes aid them in readjusting themselves. Their attractive affinity is such that in readjusting themselves they may be made to perform work, or may be made to so act upon other agents and matter that the secondary action may be made to perform work. Such secondary action may be called transformed energy. The energy observed in the animal system may be said to be transformed from the vegetable kingdom. The energy exhibited in the steam engine may be said to be transformed from the fuel burned. The action of the sun is the principal cause of stored energy on the surface of the earth. The sun's action was as effective four hundred years ago in storing energy on this continent as it is at the present time. The stored energy at that time, that was not destroyed by prairie fires was transformed into wild animals thence into wild men, that cared little for work and who possessed but little means to accomplish work, so but little work was done. Then it required a good deal of energy in rubbing sticks together to kindle a fire, and now but little energy is required for that purpose. The amount of work that a given amount of stored energy may be made to produce will depend upon the adaptability of the

means used to attain the end sought. The striking of a cold bullet placed on a cold anvil with a cold sledge hammer is not in my opinion a judicious manner to develop heat to be converted into mechanical energy for the purpose of raising sledge hammers, believing as I do that the heat generated under any circumstances would serve but little purpose, in raising the hammer back to the height from whence it descended, notwithstanding Prof. Tyndall's belief to the contrary as the following extract from a work of his indicates.

"And now for the effect of percussion. I have here a cold lead bullet, which I place upon this cold anvil, and strike it with a cold sledge hammer. The sledge descends with a certain mechanical force, and its motion is suddenly destroyed by the bullet and anvil; apparently the force of the sledge is lost. But let us examine the lead; you see it is heated, and could we gather up all the heat generated by the shock of the sledge, and apply it without loss mechanically, we should be able, by means of it, to lift this hammer to the height from which it fell."

THE HEAT DEVELOPED BY CONCUSSION.

I quote the following extract from Prof. Tyndall's work on heat as a mode of motion.

"Let us, then, fix our attention upon the wonderful substance, water, and trace it through the various stages of its existence. First we have its constituents as free atoms, which attract each other, fall, and clash together. The mechanical value of this atomic act is easily determined; knowing the number of

foot-pounds corresponding to the heating of 1 lb. of water 1°C ., we can readily calculate the number of foot-pounds equivalent to the heating of 34,000 lbs. of water 1°C . Multiplying the latter number by 1,309, we find that the concussion of our 1 lb. of hydrogen with 8 lbs. of oxygen is equal, in mechanical value, to the raising of forty-seven million pounds one foot high! I think I did not overrate matters when I said that the force of gravity, as exerted near the earth, was almost a vanishing quantity, in comparison with these molecular forces; and bear in mind the distances which separate the atoms before combination—distances so small as to be utterly immeasurable; still it is in passing over these distances that the atoms acquire a velocity sufficient to cause them to clash with the tremendous energy indicated by the above numbers.

After combination the substance is in a state of vapor, which sinks to 212° , and afterwards condenses to water. In the first instance the atoms fell together to form the compound: in the next instance the molecules of the compound fall together to form a liquid. The mechanical value of this act is also easily calculated: 9 lbs. of steam in falling to water, generate an amount of heat sufficient to raise $967 \times 9 = 8,703$ lbs. of water 1°F . Multiplying this number by 772, we have a product of 6,718,716 foot-pounds as the mechanical value of the mere act of condensation. The next great fall of our 9 lbs. of water is from the state of liquid to that of ice, and the mechanical value of this act is equal to 993,564 foot-pounds. Thus our 9 lbs. of water, in its origin and

progress, falls down three great precipices: the first fall is equivalent to the descent of a ton weight urged by gravity down a precipice 22,320 feet high; the second fall is equal to that of a ton down a precipice 2,900 feet high; and the third is equal to the descent of a ton down a precipice 433 feet high. I have seen the wild stone-avalanches of the Alps, which smoke and thunder down the declivities with a vehemence almost sufficient to stun the observer. I have also seen snow-flakes descending so softly as not to hurt the fragile spangles of which they were composed; yet to produce, from aqueous vapor, a quantity of that tender material which a child could carry, demands an exertion of energy competent to gather up the shattered blocks of the largest stone-avalanche I have ever seen, and pitch them to twice the height from which they fell."

The information the foregoing reveals regarding the wonderful energy required to form a little ice causes me to wonder how ice can be manufactured so cheaply. The foregoing computations are based on the claim that a weight falling from a height the concussion would generate heat enough, were it all transformed into mechanical energy to force it back to the position from which it fell, but substances would have to possess more of the properties of dynamite than they commonly do before I would be an advocate of such a claim. Those computations are based also on the claim that heat appears as energy when vapor condenses into water, and that heat likewise appears as energy when water is frozen into ice; but, in my opinion, the possible energy

resulting from the heat appearing, given out as furnished when nine pounds of vapor is condensed to ice, could not be transformed into mechanical energy that would pitch a stone avalanche very high.

THE EXPANSION OF GASES BY HEAT.

I quote the following extract from Tyndall's work on heat.

"Suppose I have a quantity of air contained in a very tall cylinder, A B (fig. 21), the transverse section of which is one square inch in area. Let the top A of the cylinder be open to the air, and let P be a piston, which, for reasons to be explained immediately, I will suppose to weigh two pounds one ounce, and which moves air-tight and without friction, up or down in the cylinder. At the commencement of the experiment, let the piston be at the point P of the cylinder, and let the height of the cylinder from its bottom B to the point P be 273 inches, the air underneath the piston being at a temperature of 0° C. Then, on heating the air from 0° to 1° C. the piston will rise one inch; it will now stand at 274 inches above the bottom. If the temperature be raised two degrees, the piston will stand at 275, if raised three degrees it will stand at 276, if raised ten degrees it will stand at 283, if 100 degrees it will stand at 373 inches above the bottom; finally, if the temperature were raised to 273° C., it is quite manifest 273 inches would be added to the height of the column, or, in other words, by heating the air to 273° C., its volume would be doubled.

"It is evident that the gas, in this experiment, executes work. In expanding from P upwards, it has to overcome the downward pressure of the atmosphere, which amounts to 15 lbs. on every square inch, and also the weight of the piston itself, which is 2 lbs. 1 oz. Hence, the section of the cylinder being one square inch in area, in expanding from P to P' the work done by the gas is equivalent to the raising a weight of 17 lbs. 1 oz., or 273 ounces, to a height of 273 inches."

In the foregoing experiment when the piston stands at P in place of applying heat, let lifting scales be attached to the upper surface of the piston by which means raise the piston to P'; the weight that the scales will be lifting will represent the work that heat will accomplish in raising the piston to the same height. It is evident to my mind that the space in the cylinder under the piston would have to be vacuum before the scales would be lifting 17 lbs. 1 oz. with the air in the cylinder having half of the density of the air above it, I infer that the scales would only be lifting 153 ounces.

The following extract I quote from Stoer and Eliot on inorganic chemistry:

"If sulphuric acid be mixed with ice or snow, the latter will be immediately liquefied. If the proportion of ice in the mixture be small, as compared with that of sulphuric acid, heat will be evolved much as is the case with liquid water, though to a less extent. But when a large proportion of ice is mixed with a comparatively small quantity of the acid, no heat will be perceived, but, on the contrary, intense cold."

My explanation is that ice contains in condensed forms agents that produce cold, while sulphuric acid contains in condensed forms agents that produce heat; and when the ice is liquefied in sufficient quantities the condensed cold is freed, and appears as sensible cold in excess of what neutralizes the heat liberated from the sulphuric acid. When the sulphuric acid is in excess, the heat given out more than neutralizes the cold and heat is produced.

TIDES AND THE CAUSES THAT PRODUCE THEM.

I have not given the question of ocean tides much consideration, but the little I know in regard to them leads me to believe that the accepted theory in regard to them, unaided by observation, would be a miserable failure as an aid in predicting the time that high water would occur or the height to which it would rise at different places.

As I believe that the sun and the moon has a varied attraction for the varied substances composing the surface of the earth, I believe that the sum of the attractions of the sun and moon respectively for large bodies of land as compared to the sum of their attractions for large bodies of water is the chief factor in raising tides.

VIEWS REGARDING THE PART THAT ELECTRICAL AGENTS SERVE IN THE ANIMAL SYSTEM.

I believe that the nervous system is an electrical system. I believe that a type of electricity separated from agents for which it has attraction or affinity exists in condensed forms in the food that is taken into the system. In the passage of the food through the system those electrical agents are absorbed and conveyed by nerves in most part to the brain, perhaps in minor part to other receptacles, where it exists in condensed or storage condition, to be used as the system requires. The agents that these agents seek to unite with is a component part of oxygen, which is received in the system through the lungs, and the two classes of agents become united in the system, and are expelled from the system as carbonic acid. The agents that are components of oxygen not existing in stored conditions in the system, must be constantly received therein. There takes place in the system no action, either voluntary or involuntary, muscular or otherwise, that is not effected by agents that come into the system in an unsatisfied condition while seeking a readjustment.

LIGHT AND HEAT FROM DIFFERENT CAUSES.

I believe that light and heat produced by chemical action and light and heat produced by electrical action is due to disturbed and unsatisfied conditions

of similar classes of agents. In the former case those agents exist in unsatisfied conditions in more or less condensed forms as component parts of material substances in the transformation effected by chemical action they are set free, and in seeking a satisfied condition light and heat results. In the latter case those agents are condensed in and on material substances, but not in such conditions that transformation of those substances is necessary to liberate them. When in such conditions they, in electrical action, seek a satisfied condition, light and heat may be made to result.

THE WAVE THEORY.

We are taught that there is a tenuous condition of matter filling all space, known by the name of ether. We are taught that this ether is so tenuous that its waves pass through the densest materials. We are taught that light and radiant heat is produced by waves or vibrations of this ether—those waves for to produce light, recurring at the rate of from four hundred and seventy-four millions of millions to six hundred and ninety-nine million of millions per second. While many of the waves that produce heat recur less frequently, and many of the waves that produce chemical action recur more frequently, there being a great difference in the quality of work produced by those waves, and the variations in the quality of work produced being due to the recurring period of the wave that produced it; so there is not only so many million of millions of waves of one length, but so many million of million of waves of

every other different length, all belting away during every second of time without getting in the way of each others licks.

I believe it is as reasonable to believe that there exists on the surface of the earth a dozen of ethers as to believe that there exists one ether, and I believe that it is as reasonable to believe that those are as susceptible of existing in condensed conditions as to believe them to be susceptible of existing in tenuous conditions. I believe that it is reasonable to believe that the attraction existing between the earth and the sun is the sum of the aggregation of attractions existing between the component parts of their respective formations, chemistry teaches that there is a great variety of attractions or affinities existing between the various substances or compositions existing on the earth's surface, spectrum analysis by the aid of a more delicate attractive test, as I believe light to be, teaches the same thing and goes further in teaching, that there is a variety of substances on the sun's surface that exercises a varied attraction, vegetation I believe is formed by the action of the sun in attracting certain agents and types of matter from the forming vegetation and leaving others to condense in the form of vegetation. Vegetation is always cold and moist even when the sun is shining on it in the heat of the day, this is I believe due to its structure being channels through which the sun attracts cold and moisture or the agents that produce cold and moisture from the earth when vegetation is severed from its connection with the earth it soon loses its moist and cooling

properties, for the reason that the cold and moisture which the sun is drawing from it is not replaced as before the foregoing are some of the conclusions drawn by me, not from any one particular source, but from all the sources to me available.

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some natural phenomena

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